

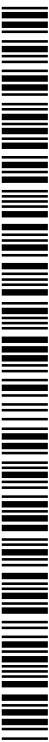


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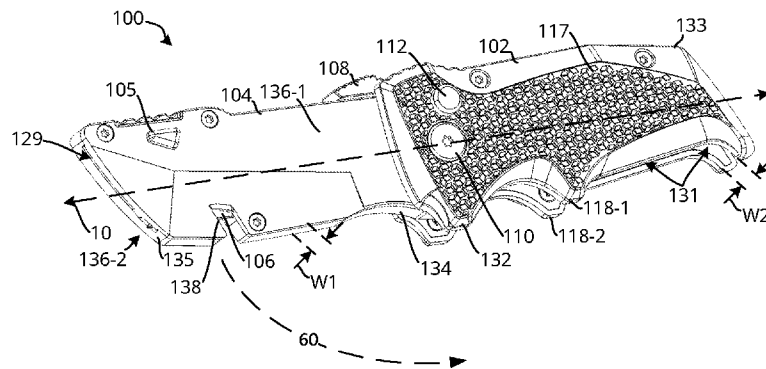


FIG. 1

(57) Abstract: A foldable utility knife is disclosed that automatically locks and prevents folding and unfolding of the same when a blade is in an extended position. The foldable utility knife may provide a locking mechanism which is hidden or otherwise obscured from a user's view. The locking mechanism may automatically engage based on a user extending a blade from a fully-retracted position to one or more extended positions, and automatically disengage based on the user retracting the blade back to the fully-retracted position. The foldable utility knife may be configured to allow a blade to be extended when the foldable utility knife is in either a folded or un-folded orientation. Thus the locking mechanism may be configured to prevent transitioning from a folded to an un-folded orientation, or vice-versa, when an edge of a blade is exposed.

FOLDING UTILITY KNIFE WITH AUTOMATIC LOCK-OUT

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FIELD OF THE DISCLOSURE

This disclosure relates to knives, and more particularly, to a foldable utility knife having a retractable blade and automatic lock-out feature preventing opening and closing of the foldable utility knife when the retractable blade is extended.

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BACKGROUND

Utility knives are used in a variety of applications, such as carpentry, floor covering installations, hobby work, mechanical work, and electrical work, just to name a few. One common type of utility knife is of relatively simple construction, having a hollow handle serving as a housing for an internally-housed retractable blade or a fixed-blade that remains with cutting edge exposed. Another type of utility knife is a foldable utility knife which may resemble folding pocket knives, also known as jackknives. Some folding utility knives may be closely related to so-called “tactical” knives, which generally have a drop point, and a long hardened steel blade that folds into the handle. Some folding utility knives include fixed blades in a blade holder portion.

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BRIEF DESCRIPTION OF THE DRAWINGS

Features and advantages of the claimed subject matter will be apparent from the following detailed description of embodiments consistent therewith, which description should be considered with reference to the accompanying drawings, wherein:

FIG. 1 shows a perspective view of an example foldable utility knife, in accordance with an embodiment of the present disclosure;

FIG. 2 shows another perspective view of the example foldable utility knife of FIG. 1 with a grip surface removed to expose a sidewall portion of the same, in accordance with an embodiment of the present disclosure;

FIG. 3 shows another perspective view of the example foldable utility knife of FIG. 1 with a portion removed to illustrate a blade and a blade carrier arrangement disposed therein, in accordance with an embodiment of the present disclosure;

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FIG. 4 shows an enlarged front perspective view of a locking mechanism disposed within the example foldable utility knife of FIG. 3, in accordance with an embodiment of the present disclosure;

5 FIG. 5 shows a profile view of the example foldable utility knife of FIG. 1 and is illustrated with sidewall portions removed to provide a back perspective view of the locking assembly, in accordance with an embodiment of the present disclosure;

FIG. 6 shows a perspective view of the example foldable utility knife of FIG. 1 in a simplified form, and illustrates how extending a blade of the same engages the locking mechanism disposed therein, in accordance with an embodiment of the present disclosure;

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FIG. 7 shows another perspective view of the example foldable utility knife of FIG. 1 in a simplified form, and illustrates how fully-retracting a blade of the same disengages the locking mechanism disposed therein, in accordance with an embodiment of the present disclosure;

15 FIG. 8 shows a top plan view of a locking tab of the locking mechanism engaged in a sidewall opening when a blade of the example foldable utility knife of FIG. 1 is in an extended position, in accordance with an embodiment of the present disclosure;

FIG. 9 shows another top plan view of the locking tab disengaged from the sidewall opening when a blade of the example foldable utility knife of FIG. 1 is in a fully-retracted position, in accordance with an embodiment of the present disclosure;

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FIG. 10 shows another perspective view of the foldable utility knife of FIG. 1 and illustrates the same in a partially-folded orientation, in accordance with an embodiment of the present disclosure;

FIG. 11 shows another perspective view of the foldable utility knife of FIG. 1 and illustrates the same in a folded orientation with the blade is in a fully-extended position, in accordance with an embodiment of the present disclosure; and

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FIG. 12 shows another perspective view of the foldable utility knife of FIG. 1 and illustrates the same in a folded orientation with the blade in a fully-retracted position, in accordance with an embodiment of the present disclosure.

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These and other features of the present embodiments will be understood better by reading the following detailed description, taken together with the figures herein described. The accompanying drawings are not intended to be drawn to scale. In the drawings, each identical or nearly identical component that is illustrated in various 5 figures is represented by a like numeral. For purposes of clarity, not every component may be labeled in every drawing.

DETAILED DESCRIPTION

As discussed above, foldable utility knives may resemble so-called “pocket knives” that fold to cover a cutting edge of a blade. In addition, utility knives may 10 include features such as retractable blades, which can allow a user to extend a blade when using the utility knife to cut or mark materials, and retract a blade to preserve its cutting edge or otherwise protect the user from accidentally cutting themselves or other objects. However, approaches to foldable utility knives may allow folding and un- 15 folding (or opening and closing) when a blade is in an extended position, thus potentially resulting in an exposed blade catching on skin or other unintended surfaces.

Thus, in accordance with an embodiment of the present disclosure, a foldable utility knife is disclosed that automatically locks and prevents folding and unfolding of the same when a blade is in an extended position. The foldable utility knife may provide a locking mechanism which is hidden or otherwise obscured from a user’s view. The 20 locking mechanism may automatically engage based on a user extending a blade from a fully-retracted position to one or more extended positions, and automatically disengage based on the user retracting the blade back to the fully-retracted position. The foldable utility knife may be configured to allow a blade to be extended when the foldable utility knife is in either a folded or un-folded orientation. Thus the locking mechanism may be 25 configured to prevent transitioning from a folded to an un-folded orientation, or vice-versa, when a blade is in an extended position.

In more detail, the foldable utility knife may include a first handle member rotatably coupled to a second handle member. The first handle member can include a grip structure designed to prevent slippage when the foldable utility knife is in use by a 30 user. The first handle member may be configured with an opening configured to receive the second handle member when the utility knife is in a folded orientation. The opening

may be configured to at least partially receive the second handle member such that the foldable utility knife is relatively compact and securely holds the second handle member in place. The second handle member may include a cavity that provides a track or path that allows a blade carrier to be contained therein and travel along a plurality of user-selectable positions. A thumb-actuator coupled to the blade carrier may allow a user to extend or retract the same such that a blade supported therein is either in a fully-retracted position or one or more extended positions to expose a cutting surface of the blade for cutting or marking purposes when in use.

In an embodiment, the foldable utility knife includes a locking mechanism disposed in a cavity of the second handle member. The locking mechanism may include a pin configured to be mounted within the cavity, with a locking tab mounted coaxially with the pin. A spring member may concentrically wrap around the pin and be configured to bias the locking tab. Thus, when a blade of the foldable utility knife is at least partially extended, e.g., pushed forward towards an opening of the second handle member, the spring member may bias the locking tab and cause the same to rotate about the pin in a first direction. The locking tab may be shaped such that the rotation in the first direction causes at least a portion of the locking tab to engage a sidewall opening provided by the first handle member. On the other hand, when the blade is in a fully-retracted position, e.g., in a furthest backward position, the blade carrier may displace the locking tab causing the same to rotate in a second direction, with the second direction being opposite of the first. The rotation in the second direction may cause the locking tab to disengage from the sidewall opening of the first handle member such that the locking tab is fully within the cavity of the second handle member, thus allowing the first handle member to move relative to the second handle member. As should be appreciated, the rotation of the locking tab in the second direction also causes the spring member to compress in order to provide spring-loaded force to the same once the blade is subsequently moved by a user to an extended position.

Thus, in a general sense, the foldable utility knife may be configured to automatically unlock when the blade is in a fully-retracted position, and allow for rotational movement of the first handle member relative to the second handle member for the purposes of folding/unfolding the utility knife. On the other hand, and when in an extended position, the blade carrier may be configured to allow the locking tab to engage

with the sidewall opening of the first handle member based on the bias provided by the spring member. To this end, the foldable utility knife may be configured to automatically lock when the blade is extended and prevent rotational movement of the first handle member relative to the second handle member.

5 As should be appreciated, aspects and embodiments disclosed herein allow a foldable utility knife to automatically lock or unlock without conscious or otherwise deliberate effort from a user. A user may easily identify the foldable utility knife is in a so-called “locked-mode” based on the utility knife blocking/resisting folding or unfolding movements, even when a user engages a folding or release button of the
10 foldable utility knife. To this end, a user may fully-retract a blade to unlock the foldable utility knife, e.g., to transition to a so-called “unlocked-mode”, and then may safely fold or unfold the foldable utility knife.

As generally referred to herein, the term “fully-retracted” may not necessarily refer to a furthest rearward position of the blade. For example, fully-retracted may also
15 refer to a position whereby a cutting or marking edge of the blade is fully within the second handle member but not necessarily at the furthest rearward position.

Now referring to the figures, FIG. 1 shows a perspective view of a foldable utility knife 100 in accordance with an embodiment of the present disclosure. As shown, the foldable utility knife 100 includes a first handle member 102 and a second handle member 104. The first handle member 102 includes a plurality of sidewalls including a
20 first sidewall 118-1 and second sidewall 118-2, and a third sidewall 118-3 (FIG. 3). The plurality of sidewalls may extend along a first major axis 10 or longitudinal axis from a first end 132 to a second end 133. The first and second sidewalls 118-1 and 118-2 may be disposed substantially opposite one another and may define a cavity 131 there
25 between. The cavity 131 may extend along at least a portion of the first handle member 102. The first handle member 102 may further include a button 112 or release member configured to allow the second handle member 104 to rotate relative to the first handle member 102 to a folded or unfolded orientation, e.g., when the foldable utility knife 100 is in an unlocked mode.

30 The second handle member 104 may be rotatably attached at a position near of the first end 132 of the first handle member 102. In some cases, and as shown, the

second handle member 104 and the first handle member 102 may be rotatably coupled to one another via a fastener member, such as the fastener member 110 shown in FIG. 1. As shown, the second handle member 104 includes a plurality of sidewalls including at least a first sidewall 136-1 and a second sidewall 136-2. The first and second sidewalls 136-1 and 136-2 may also extend along a first major axis 10 or longitudinal axis from a first end 135 to a second end 134. The first and second sidewalls 136-1 and 136-2 may be disposed substantially opposite one another and may define an opening 129 that transitions into a cavity 130 (FIG. 3) formed there between.

The second handle member 104 may further include a blade 106 at least partially disposed within the cavity 130. The blade 106 may comprise a standard utility knife blade or other blade types including so-called “pencil” blades configured to mark or score surfaces. A thumb actuator 108 or member may allow the blade 106 to be transitioned from a retracted position to an extended position, as further discussed below with regard to FIG. 3. The second handle member 104 may include a quick-release member 105 designed to be pressed or otherwise actuated by a user to cause release of the blade 106 such that the blade may be easily pulled through the opening 129 for replacement or reorientation purposes. In an embodiment, the second handle member 104 also includes a sidewall feature 138 or opening that exposes a portion of a cutting edge of the blade 106 even when the blade is not fully-extended or otherwise exposed via the opening 129. The sidewall feature 138 may comprise a channel or guide that allows a user to align a material with the exposed portion of the cutting edge of the blade 106. For example, an insulated wire may be inserted into sidewall feature 138 for the purposes of cutting or stripping the insulated wire. Numerous other uses for the sidewall feature 138 should be apparent in light of this disclosure including, for example, cutting string, twine, rope or other materials that may be inserted into the sidewall feature 138. Although the blade 106 is shown as a standard utility blade having a two-notch design, other blades/markers are within the scope of this disclosure. For instance, the foldable utility knife 100 may be configured to use 4-notch blades and other blade shapes/designs with minor modification.

The second handle member 104 may be configured to rotate about the fastening member 110 relative to the first handle member 102 from an unfolded orientation (as shown) to a folded orientation generally along path 60 (FIG. 3). For example, FIG. 10

illustrates the foldable utility knife 100 in a partially-folded orientation. Returning to FIG. 1, the second handle member 104 may be configured with a width W1 that is less than a width W2 of the cavity 131 of the first handle member 102, which may allow the second handle member 104 to be received by the cavity 131 and at least partially disposed therein when the foldable utility knife 100 is in a folded orientation. For example, FIGs. 11 and 12 each show the foldable utility knife 100 in a folded orientation. As should be appreciated, this may allow a user to perform cutting/marking tasks with the foldable utility knife in a folded (compact) orientation, or in an unfolded (full-length) orientation.

In some cases, the first and second handle members 102 and 104 may each be formed as a single layer of material such as, for example, metal, plastic, stone, or any other suitably rigid material. Thus the foldable utility knife 100 may comprise a so-called “all-metal” or “all-plastic/composite” construction. In other cases, the first and second handle members 102 and 104 may be formed from multiple segments and/or layers of a same or different suitably rigid material, depending on a desired configuration. For instance, a grip surface layer 117 may be disposed on an outer surface of the first sidewall 118-1, as illustrated in FIG. 1. The grip surface layer 117 may comprise a pattern of protrusions configured to reduce slipping when held in a user’s hand during use. The pattern of protrusions may be formed from, for example, a plastic, a polymer, a metallic material, or any other material that provides suitable friction between a user’s hand or glove and the foldable utility knife 100.

Turning to FIG. 2, another perspective view of a foldable utility knife 100 is shown with the grip surface layer 117 removed to illustrate additional aspects in greater detail, in accordance with an embodiment of the present disclosure. As shown, the first sidewall 118-1 includes first and second sidewall openings 114-1 and 114-2 or slots. The first sidewall opening 114-1 may be configured to receive a locking tab 122 or locking member, which is shown and described in greater detail below with reference to FIG. 4, when the foldable utility knife 100 is in an unfolded configuration. The second sidewall opening 114-2 may also be configured to receive the locking tab 122 when the foldable utility knife 100 is in a folded configuration. Thus the first and second sidewall openings 114-1 and 114-2 may be accurately described as locking features. As should be appreciated in light of this disclosure, other types of locking features having various

configurations and shapes may be configured to engage the locking tab 122 and prevent rotational movement of the first handle member 102 relative to the second handle member 104, and thus the present disclosure should not necessarily be limited to only slots or other such features comprising a through-hole.

5 As should be appreciated, the position of the locking tab 122 may change relative to the position of the second handle member 104. Stated differently, the locking tab 122 may travel with the second handle member 104 such that rotation of the same causes the locking tab 122 to align with the first sidewall opening 114-1 when in the unfolded configuration, and to align with the second sidewall opening 114-2 when in the folded
10 configuration. For example, and returning to FIG. 10, the first and second handle members 102 and 104 are illustrated in a transparent manner in order to illustrate how the locking tab 122 aligns with the first sidewall opening 114-1 when the foldable utility knife is in an unfolded orientation, and aligns with the second sidewall opening 114-2 when the foldable utility knife is in a folded orientation.

15 In an embodiment, a portion of the sidewall openings 114-1 and 114-2 may be formed or otherwise provided by multiple layers and is not necessarily limited to the embodiment illustrated in FIGs. 2-12. For example, a portion of the grip surface layer 117 may be recessed in locations adjacent to the first and second sidewall openings 114-1 and 114-2 such that a portion of the locking tab 122 extended there through is received
20 by one of the recesses provided by the grip surface layer 117. In some cases, the foldable utility knife 100 may include only a single locking feature on the sidewall 118-1. For example, it may be desirable to provide locking functionality only when the knife is in an unfolded or folded orientation. Thus the particular locking features present may accommodate such configurations, if desired. In addition, it should be appreciated that
25 the particular sidewall of the first handle member used to engage/disengage with the locking tab 122 is not necessarily limited to the sidewall 118-1. For example, the first and second sidewall openings 114-1 and 114-2 may be disposed on an opposite sidewall, such as the sidewall 118-2. To this end, the locking mechanism disclosed herein may be disposed in a manner that engages one or more sidewall openings disposed on the
30 sidewall 118-2. In any such cases, it should be appreciated that the locking mechanism may be disposed in a plurality of different configurations and locations (e.g., a different handle member) with minor modification to achieve desired locking/unlocking

functionality, and thus, the specific embodiments illustrated and discussed herein should not be construed as limiting the present disclosure.

The locking mechanism may be correctly understood to form a locking means whereby rotational movement of the first handle member relative to the second handle member is prevented until a blade is retracted into a cavity of the second handle member. In particular, the locking tab and various sidewall features configured to engage with the locking tab and prevent such rotational movement may provide such means. As should be appreciated, such means should not be construed as limited to only the locking tab and sidewall openings/features depicted within various figures and discussed herein. For example, the locking mechanism may comprise any suitable mechanical assembly configured to selectively engage/disengage locking of the first and second handle members. For example, the locking mechanism may comprise a detent or other similar structure that may be engaged and disengaged to provide locking and unlocking functionality.

Turning to FIG. 3, another example perspective view of the foldable utility knife 100 is shown with both the grip layer surface 117 removed and the first sidewall 136-1 removed to show additional aspects of the foldable utility knife 100 in further detail, in accordance with an embodiment of the present disclosure. As shown, the cavity 130 includes a blade carrier 120 slidably disposed therein, with the blade carrier 120 configured to removably couple to the blade 106 and travel longitudinally along a plurality of user-selectable positions (e.g., positions 140-1 to 140-4). The blade carrier 120 may be formed from, for example, plastic, metal, or any other suitable material that is capable of supporting a blade during use of the foldable utility knife. As should be appreciated in light of this disclosure, the blade carrier 120 may include various geometries and configurations, and should not be limited to merely the embodiment illustrated in FIG. 3.

The cavity 130 may provide a track along which the longitudinal movement of the blade carrier 120 may occur. The track may be provided by a surface of the sidewalls defining the cavity 130, such as shown, or may be provided by an insert formed of plastic, metal or other suitable material. The thumb actuator 108 may be configured to cause the blade carrier 120 to travel along the plurality of user-selectable positions in a

forward (e.g., towards the opening 129) and backward (e.g., away from the opening 129) manner along the track. As should be appreciated, the thumb actuator 108 may be configured with various geometries and textures and is not necessarily limited to the embodiment shown in FIG. 1. In addition, the particular location of the thumb actuator 108 or equivalent member is not necessarily limited to the location shown and may be disposed on, for instance, the sidewall 136-1, or other sidewall of the second handle member.

The plurality of user-selectable positions may include at least two fixed-positions, with each fixed-position locking the blade at a particular position such that longitudinal movement is prevented until the thumb actuator 108 is depressed or otherwise engaged by a user. The fixed-positions may be provided by, for example, a tongue-and-groove arrangement whereby a portion of the thumb actuator 108 engages one of a plurality of groves disposed at positions 140-1 to 140-2, for example, when the thumb actuator 108 is released or otherwise disengaged by a user. A spring (not shown) may bias the thumb actuator 108 and may cause the portion of the thumb actuator 108 to engage one of the groves at positions 140-1 to 140-4, thus preventing longitudinal movement of the blade 106 during cutting/marking operations. The first groove, e.g., at position 140-1, which is proximal to the first end 132 of the first handle member 102, may be understood to be the retracted or fully-retracted position of the blade 106. The groves located at positions 140-2 to 140-4 may be understood to be extended positions, with the groove at position 140-4 providing a fully-extended position whereat a portion of the edge of the blade 106 extends through the opening 129 and is exposed. As should be appreciated, more or fewer extendable positions may be provided by the foldable utility knife 100 depending on a desired configuration. In one embodiment, the foldable utility knife 100 includes a fully-retracted position and a single extended position. The longitudinal track, blade carrier, and thumb actuator may be understood to form means configured to extend and retract the blade 106.

In use, a user depresses or otherwise engages the thumb-actuator 108 and exerts force in a forward or backward direction to cause the blade 106 to transition/move to one of the plurality of user-selectable positions, with each user-selectable position corresponding to one of the grooves at the positions 140-2 to 140-4, for example. When in an extended position, the blade carrier 120 may disengage with the locking tab 122

such that a portion of the blade carrier 120 is no longer in direct or indirect contact with the locking tab 122. For example, FIG. 4 shows an enlarged view of the outlined section labeled A-A in FIG. 3, and illustrates additional aspects of a locking mechanism of the foldable utility knife 100 in further detail. As shown, a rear portion 121 of the blade carrier 120 is configured to movably engage/disengage with a carrier engagement portion 123 of the locking tab 122 relative to the movement/displacement of the blade carrier 120. For example, the engagement or disengagement between the blade carrier 120 and the locking tab 122 may be the direct result of a user extending or retracting the blade 106 via the thumb actuator 108. Thus when the blade 106 is transitioned from the fully-retracted position (e.g., the thumb actuator engaged at position 140-1) to an extended position, the rear portion 121 of the blade carrier travels in a longitudinal direction away from the carrier engagement portion 123 of the locking tab 122 such that a force applied thereto is reduced relative to the extent of the movement. Accordingly, and with additional reference to FIG. 6, when the blade carrier 120 has moved sufficiently away, e.g., to the groove at the position 140-2, the blade carrier 120 may no longer be in contact with the carrier engagement portion 123, or otherwise prevent rotational movement thereof, and may allow a spring member 126 to bias the locking tab 122 in a forward manner. This may result in the locking tab 122 rotating in a counter-clockwise direction about the pin 124, with the rotation causing a portion 116 or locking portion of the same to enter/engage the first sidewall opening 114-1 or the second sidewall opening 114-2 of the first sidewall 118-1, depending on whether the foldable utility knife 100 is in a folded or unfolded orientation. Thus the orientation of the locking tab 122 may be understood to be in a locked position, whereby the locking tab 122 extends transverse relative to the major axis 11 or longitudinal axis when the blade 106 is in an extended position.

For example, as shown in FIG. 8, a top-down view of the locking tab 122 is illustrated in the locked-position relative to the first sidewall 118-1 of the first handle member 102. As should be appreciated, the top-down view of the locking tab 122 is illustrated in a highly-simplified manner for the purpose of clarity and practicality. Likewise, the dimensions of the locking tab 122, the first sidewall 118-1, and the portion 116 of the locking tab 122 extending from the first sidewall 118-1 are illustrated in an exaggerated manner and should not be construed as limiting. The locking tab 116 may

be formed from, for example, metal, plastic, or any other suitably rigid material that is capable of preventing rotational movements of the first handle member relative to the second handle member without sheering or otherwise breaking when exposed to a user-exerted force while a user attempts to fold/unfold the foldable utility knife 100 when
5 locked.

As shown, the locking portion 116 of the locking tab 122 extends at least partially into the first sidewall 118-1 (but not necessarily through) via the sidewall opening 114-1 or 114-2. The locking portion 116 is shown in a shaded manner merely for the purpose of illustrating the portion that is received by or otherwise engages with the sidewall
10 opening 114-1 or 114-2. Thus the second handle member 104 is prevented from rotating relative to the first handle member 102 in the locked position as the locking tab interrupts or otherwise prevents rotational movement.

Returning to FIG. 4, the rotation of the locking tab 122 may occur even after a relatively short distance traveled by the blade carrier 120 based on the shape or contours
15 of the blade carrier 120 providing a clearance for the locking tab 122. For example, the blade carrier 120 may include a notch 127 having a generally arcuate surface, as illustrated. Thus any longitudinal movement of the blade 106 away from the fully-retracted position may cause a corresponding rotational/pivot movement of the locking tab to engage a locking function and prevent folding/unfolding of the foldable utility
20 knife 100.

On the other hand, when the blade 106 transitions from an extended position, e.g., when the thumb-actuator is engaged at one of the notches at the positions 140-2 to 140-3, to the fully-retracted position, e.g., when the thumb-actuator is engaged at the notch at position 140-1, the rear portion 121 of the blade carrier travels longitudinally
25 towards the carrier engagement portion 123 of the locking tab 122 and directly or indirectly applies a force thereto. Accordingly, and with additional reference to FIG. 7, when the blade carrier 120 has moved to the fully-retracted position, the blade carrier 120 may make direct or indirect contact with the carrier engagement portion 123 of the locking tab 122 causing the same to rotate in a clock-wise direction about the pin 124.
30 This rotation may cause the portion 116 of the locking tab 122 to disengage from the first sidewall opening 114-1 or the second sidewall opening 114-2 and retract into a cavity

provided by the second handle member 104. Thus the orientation of the locking tab 122 may be understood to be in an unlocked position when the blade 106 is in the fully-retracted position.

Referring to FIG. 9, a top-down view of the locking tab 122 is illustrated in the unlocked position relative to the first sidewall 118-1 of the first handle member 102. As should be appreciated, the top-down view of the locking tab 122 is illustrated in a highly-simplified manner for the purpose of clarity and practicality. Likewise, the dimensions of the locking tab 122 and the first sidewall 118-1 are illustrated in an exaggerated manner and should not be construed as limiting. As shown, the locking portion 116 of the locking tab 122 is substantially within a cavity of the second handle member such that the locking portion 116 does not extend into the sidewall openings 114-1 or 114-2. Thus the second handle member 104 is free to rotate relative to the first handle member 102 while the blade 106 is in the fully-retracted position.

As should be appreciated, the particular extent of the rotation in the clockwise direction to disengage the locking tab 122 is about 10 degrees, but should not be construed as limited in this regard as various geometries and configurations may alter the particular amount of travel before the locking tab 122 is disengaged. Likewise, the extent of the rotation in the counter clockwise direction to engage the locking tab 122 is about 10 degrees, but numerous other embodiments are within the scope of this disclosure. In addition, the particular directions that cause disengagement/engagement of the locking tab 122 may vary depending on whether the locking assembly is configured to engage with a sidewall feature on a different sidewall of the first handle member. Thus it may be generally understood that a first direction of rotation may be configured to engage the locking tab 122 after traveling a particular distance D, and a second direction of rotation opposite the first direction of rotation may be configured to disengage the locking tab 122 after traveling substantially the same distance D.

The locking tab 122 illustrated in FIGs. 8 and 9 comprise an irregular shape having certain contours and features such as the carrier engagement portion 123, spring catch region 142, and the locking portion 116 to allow for locking and unlocking based on whether the blade 106 is in a fully-retracted position or in an extended position. The

particular dimensions and features shown should not be construed as limiting as other geometries and designs are suitable and are within the scope of this disclosure.

Turning to FIG. 5, a profile view of the example foldable utility knife of FIG. 1 is shown and is illustrated with sidewall portions removed to provide a back perspective view of the locking assembly, in accordance with an embodiment of the present disclosure. As shown, the pin 124 or cam is mounted in a fixed-position within a cavity of the second handle member 104. The locking tab 122 is disposed coaxially with the pin 124 and is configured to rotate about the same in a clockwise fashion based on the rear portion 121 of the blade carrier 120 engaging the carrier engagement portion 123 of the locking tab 122, or counter-clockwise based on the spring member 126 biasing the locking tab 122. Thus the spring member 126 may be understood to provide a spring-loaded bias wherein the absence of the rear portion 121 of the blade carrier 120 allows the spring to release its tension and cause the locking tab 122 to at least partially extend into one of the sidewall openings 114-1 and 114-2. The spring tension may be based at least in part on the spring catch 128 that holds a portion of the spring 126 in place and allows tension to build relative to the rotation of the locking tab 122. As should be appreciated, the locking tab 122 and pin 124 may comprise a single member or multiple members, such as shown.

Continuing to FIG. 11, a perspective view of the foldable utility knife 100 shows the same in a folded orientation and with the blade 106 in an extended position. Thus, the locking tab 122 may at least partially extend into the second sidewall opening 114-2 and prevent unfolding of the foldable utility knife 100 by the user. FIG. 12, on the other hand, shows the foldable utility knife 100 in the folded orientation with the blade 106 in a fully-retracted position, e.g., based on the thumb-actuator 108 being in a furthest rearward position. Thus, the locking tab 122 is disengaged from the second sidewall opening 114-2 and does not prevent a user from transitioning the foldable utility knife into an unfolded orientation.

Further Example Embodiments

One aspect of the present disclosure discloses a utility knife, the utility knife comprising a first handle member comprising a plurality of sidewalls, a second handle

member comprising a plurality of sidewalls and being rotatably coupled to the first handle member, the second handle member having a cavity with a blade carrier disposed therein, the blade carrier being configured to travel longitudinally to extend an edge of a blade from an opening of the second handle member and to retract the blade into the cavity, and wherein the first handle member is configured to rotate relative to the second handle member to transition the utility knife between a folded orientation and an unfolded orientation, and wherein a locking mechanism locks the utility knife in at least one of the folded and unfolded orientations until the edge of the blade is retracted within the cavity.

10 In one aspect, the first and second handle members may be rotatably coupled to one another by way of a fastener, and wherein, when transitioning from the unfolded orientation to the folded orientation, the second handle member may be configured to rotate inwardly in a direction towards the first handle member and be at least partially received within a cavity defined in the first handle member. In addition, the first handle member may include a grip surface layer disposed on one or more of the plurality of sidewalls.

In one aspect, the utility knife may further comprise a thumb actuator coupled to the blade carrier and configured to allow a force applied by a user to extend or retract the blade carrier. In another aspect, the locking mechanism may comprise a locking tab disposed in a cavity of the second handle member and is configured to engage a locking feature of the first handle member to prevent rotational movement of the first handle member relative to the second handle member when the blade is at least partially extended from the opening of the second handle member. In addition, the at least a portion of the locking tab may engage the locking feature of the first handle member based on a spring-loaded mechanism configured to bias the locking tab. Further, the locking tab may be configured to disengage with the locking feature of the first handle member to allow rotational movement of the first handle member relative to the second handle member when the blade is retracted within the second handle member. Yet further, the locking tab may be configured to disengage with the locking feature based on the blade carrier physically displacing the locking tab.

In one aspect, the locking mechanism of the second handle member may be configured to engage a first locking feature of the first handle member when the utility knife is in the unfolded orientation, and a second locking feature of the first handle member when the utility knife is in the folded orientation. In addition, the locking mechanism may comprise a locking tab, and wherein at least one of the first locking feature and the second locking feature may comprise a sidewall opening configured to receive at least a portion of the locking tab.

Another aspect of the present disclosure discloses a utility knife, the utility knife comprising a first handle member comprising at least first and second sidewalls, a second handle member rotatably coupled to the first handle member, the second handle member comprising at least first and second sidewalls defining an opening at an end of the second handle member that transitions into a cavity, a blade at least partially disposed in the cavity of the second handle member and configured to be transitioned between a retracted position and at least one extended position within the second handle member, and wherein in response to the blade being transitioned to the at least one extended position, a locking member prevents the second handle member rotating relative to the first handle member such that the second handle member is locked in at least one of a folded and unfolded orientation until the blade is transitioned to the retracted position.

In one aspect, the first and second handle members may be rotatably coupled to one another by way of a fastener. In addition, the second handle member may be configured to rotate about the fastener between the folded and unfolded orientations, and wherein, when transitioning from the unfolded orientation to the folded orientation, the second handle member may be configured to rotate inwardly in a direction towards the first handle member and be at least partially received within a cavity defined in the first handle member.

In one aspect, the utility knife may further comprise a blade carrier slidably received within the cavity of the second handle member, the blade carrier being configured to support the blade and configured to transition the blade between the retracted position and the at least one extended position along a longitudinal track provided within the cavity.

In one aspect, the first handle member may comprise at least one of a first sidewall opening configured to receive at least a portion of the locking member when the utility knife is in an unfolded orientation, and a second sidewall opening configured to receive at least a portion of the locking member when the utility knife is in a folded orientation.

In one aspect, a pin may be disposed within a cavity of the second handle member, the locking member being mounted coaxial with the pin and being configured to rotate about the pin. In this aspect, the locking member may be configured to rotate about the pin in a first direction to an unlocked position in response to the blade transitioning to the retracted position, the retracted position causing a blade carrier to make contact with a blade carrier engagement portion of the locking member to displace and cause rotation of the locking member to occur, wherein the locking member in the unlocked position is disengaged from the first sidewall opening or the second sidewall opening and allows the first handle member to rotate relative to the second handle member. In addition, a spring member may be mounted coaxial with the pin, wherein the locking member may be configured to rotate about the pin in a second direction to a locked position in response to the blade transitioning from the retracted position to the at least one extended position, the at least one extended position causing a blade carrier to travel away from the locking member allowing the spring member to bias and displace the locking member in the second direction, wherein at least a portion of the locking member engages with the first sidewall opening or the second sidewall opening in the locked position and prevents the first handle member from rotating relative to the second handle member.

In one aspect, the first handle member includes at least one layer disposed thereon, with the at least one layer hiding one or more sidewall openings of the first handle member from view.

Another aspect of the present disclosure discloses a utility knife, the utility knife comprising a first handle member comprising a plurality of sidewalls defining a cavity, a second handle member comprising a plurality of sidewalls and rotatably coupled to the first handle member, a blade at least partially disposed in a cavity of the second handle member, means for extending an edge of the blade from the cavity of the second handle

member and retracting the blade into the cavity, and means for locking rotational movement of the first handle member relative to the second handle member in response to the blade being at least partially extended from the cavity of the second handle member.

5 While several embodiments of the present disclosure have been described and illustrated herein, those of ordinary skill in the art will readily envision a variety of other means and/or structures for performing the functions and/or obtaining the results and/or one or more of the advantages described herein, and each of such variations and/or modifications is deemed to be within the scope of the present disclosure. More
10 generally, those skilled in the art will readily appreciate that all parameters, dimensions, materials, and configurations described herein are meant to be exemplary and that the actual parameters, dimensions, materials, and/or configurations will depend upon the specific application or applications for which the teachings of the present disclosure is/are used. Those skilled in the art will recognize, or be able to ascertain using no more
15 than routine experimentation, many equivalents to the specific embodiments of the disclosure described herein. It is, therefore, to be understood that the foregoing embodiments are presented by way of example only and that, within the scope of the appended claims and equivalents thereto, the disclosure may be practiced otherwise than as specifically described and claimed. The present disclosure is directed to each
20 individual feature, system, article, material, kit, and/or method described herein. In addition, any combination of two or more such features, systems, articles, materials, kits, and/or methods, if such features, systems, articles, materials, kits, and/or methods are not mutually inconsistent, is included within the scope of the present disclosure.

25 All definitions, as defined and used herein, should be understood to control over dictionary definitions, definitions in documents incorporated by reference, and/or ordinary meanings of the defined terms.

 The indefinite articles “a” and “an,” as used herein in the specification and in the claims, unless clearly indicated to the contrary, should be understood to mean “at least one.”

30 The phrase “and/or,” as used herein in the specification and in the claims, should be understood to mean “either or both” of the elements so conjoined, i.e., elements that are

conjunctively present in some cases and disjunctively present in other cases. Other elements may optionally be present other than the elements specifically identified by the “and/or” clause, whether related or unrelated to those elements specifically identified, unless clearly indicated to the contrary.

CLAIMS

What is claimed is:

1. A utility knife comprising:
a first handle member comprising a plurality of sidewalls;
a second handle member comprising a plurality of sidewalls and being rotatably coupled to the first handle member, the second handle member having a cavity with a blade carrier disposed therein, the blade carrier being configured to travel longitudinally to extend an edge of a blade from an opening of the second handle member and to retract the blade into the cavity; and
wherein the first handle member is configured to rotate relative to the second handle member to transition the utility knife between a folded orientation and an unfolded orientation, and wherein a locking mechanism locks the utility knife in at least one of the folded and unfolded orientations until the edge of the blade is retracted within the cavity.
2. The utility knife of claim 1, wherein the first and second handle members are rotatably coupled to one another by way of a fastener, and wherein, when transitioning from the unfolded orientation to the folded orientation, the second handle member is configured to rotate inwardly in a direction towards the first handle member and be at least partially received within a cavity defined in the first handle member.
3. The utility knife of claim 2, wherein the first handle member includes a grip surface layer disposed on one or more of the plurality of sidewalls.
4. The utility knife of claim 1, wherein the utility knife further comprises a thumb actuator coupled to the blade carrier and configured to allow a force applied by a user to extend or retract the blade carrier.
5. The utility knife of claim 1, wherein the locking mechanism comprises a locking tab disposed in a cavity of the second handle member and is configured to engage a locking feature of the first handle member to prevent rotational movement of the first handle member relative to the

second handle member when the blade is at least partially extended from the opening of the second handle member.

6. The utility knife of claim 5, wherein at least a portion of the locking tab engages the locking feature of the first handle member based on a spring-loaded mechanism configured to bias the locking tab.

7. The utility knife of claim 5, wherein the locking tab is configured to disengage with the locking feature of the first handle member to allow rotational movement of the first handle member relative to the second handle member when the blade is retracted within the second handle member.

8. The utility knife of claim 7, wherein the locking tab is configured to disengage with the locking feature based on the blade carrier physically displacing the locking tab.

9. The utility knife of claim 1, wherein the locking mechanism of the second handle member is configured to engage a first locking feature of the first handle member when the utility knife is in the unfolded orientation, and a second locking feature of the first handle member when the utility knife is in the folded orientation.

10. The utility knife of claim 9, wherein the locking mechanism comprises a locking tab, and wherein at least one of the first locking feature and the second locking feature comprise a sidewall opening configured to receive at least a portion of the locking tab.

11. A utility knife comprising:
a first handle member comprising at least first and second sidewalls;
a second handle member rotatably coupled to the first handle member, the second handle member comprising at least first and second sidewalls defining an opening at an end of the second handle member that transitions into a cavity;
a blade at least partially disposed in the cavity of the second handle member and configured to be transitioned between a retracted position and at least one extended position within the second handle member; and

wherein in response to the blade being transitioned to the at least one extended position, a locking member prevents the second handle member rotating relative to the first handle member such that the second handle member is locked in at least one of a folded and unfolded orientation until the blade is transitioned to the retracted position.

12. The utility knife of claim 11, wherein the first and second handle members are rotatably coupled to one another by way of a fastener.

13. The utility knife of claim 12, wherein the second handle member is configured to rotate about the fastener between the folded and unfolded orientations, and wherein, when transitioning from the unfolded orientation to the folded orientation, the second handle member is configured to rotate inwardly in a direction towards the first handle member and be at least partially received within a cavity defined in the first handle member.

14. The utility knife of claim 11, further comprising a blade carrier slidably received within the cavity of the second handle member, the blade carrier being configured to support the blade and configured to transition the blade between the retracted position and the at least one extended position along a longitudinal track provided within the cavity.

15. The utility knife of claim 11, wherein the first handle member comprises at least one of a first sidewall opening configured to receive at least a portion of the locking member when the utility knife is in an unfolded orientation, and a second sidewall opening configured to receive at least a portion of the locking member when the utility knife is in a folded orientation.

16. The utility knife of claim 15, further comprising a pin disposed within a cavity of the second handle member, the locking member being mounted coaxial with the pin and being configured to rotate about the pin.

17. The utility knife of claim 16, wherein the locking member is configured to rotate about the pin in a first direction to an unlocked position in response to the blade transitioning to the retracted position, the retracted position causing a blade carrier to make contact with a blade carrier engagement portion of the locking member to displace and cause rotation of the locking member to

occur, wherein the locking member in the unlocked position is disengaged from the first sidewall opening or the second sidewall opening and allows the first handle member to rotate relative to the second handle member.

18. The utility knife of claim 16, further comprising a spring member being mounted coaxial with the pin, wherein the locking member is configured to rotate about the pin in a second direction to a locked position in response to the blade transitioning from the retracted position to the at least one extended position, the at least one extended position causing a blade carrier to travel away from the locking member allowing the spring member to bias and displace the locking member in the second direction, wherein at least a portion of the locking member engages with the first sidewall opening or the second sidewall opening in the locked position and prevents the first handle member from rotating relative to the second handle member.

19. The utility knife of claim 11, wherein the first handle member includes at least one layer disposed thereon, with the at least one layer hiding one or more sidewall openings of the first handle member from view.

20. A utility knife comprising:
a first handle member comprising a plurality of sidewalls defining a cavity;
a second handle member comprising a plurality of sidewalls and rotatably coupled to the first handle member;
a blade at least partially disposed in a cavity of the second handle member;
means for extending an edge of the blade from the cavity of the second handle member and retracting the blade into the cavity; and
means for locking rotational movement of the first handle member relative to the second handle member in response to the blade being at least partially extended from the cavity of the second handle member.

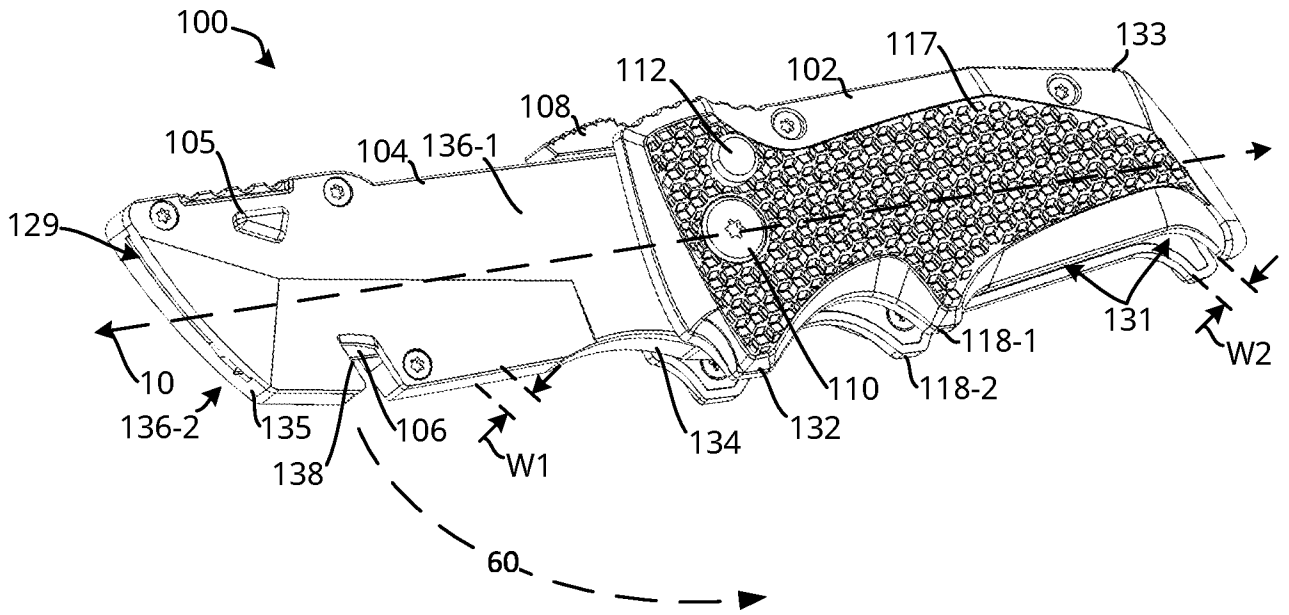


FIG. 1

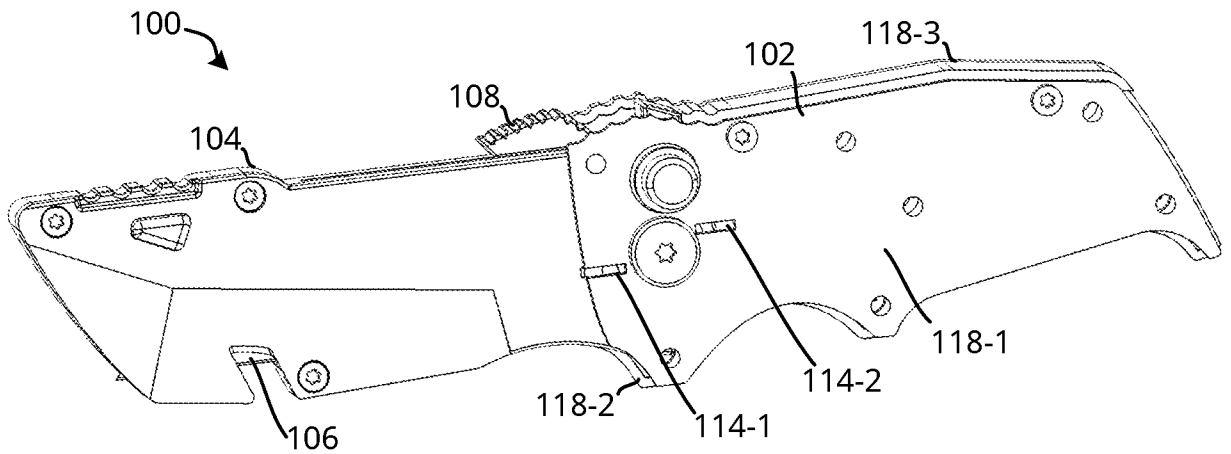


FIG. 2

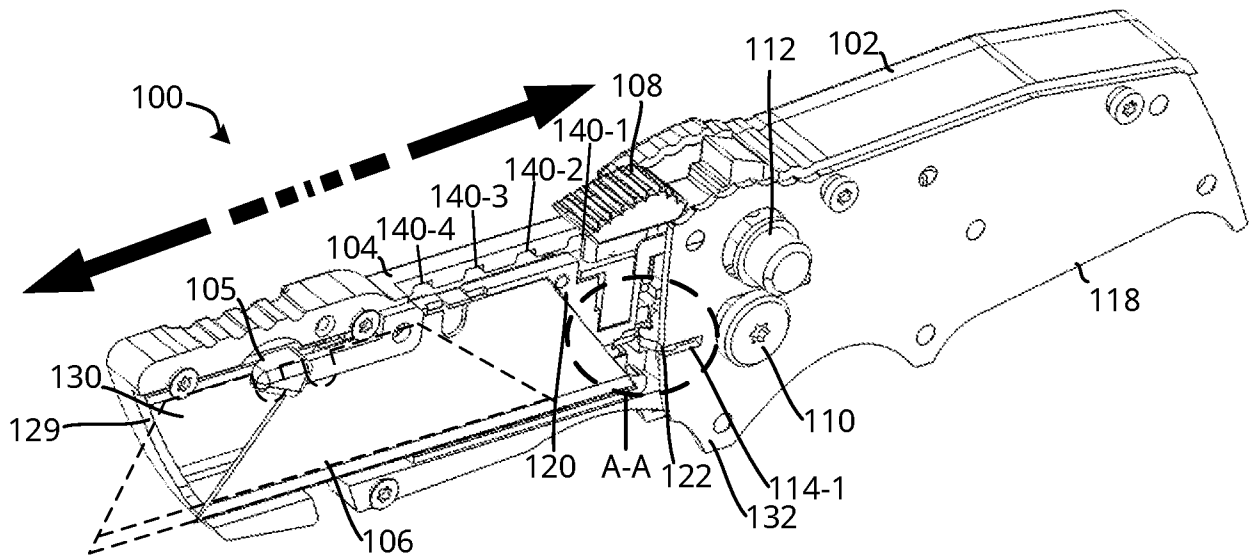


FIG. 3

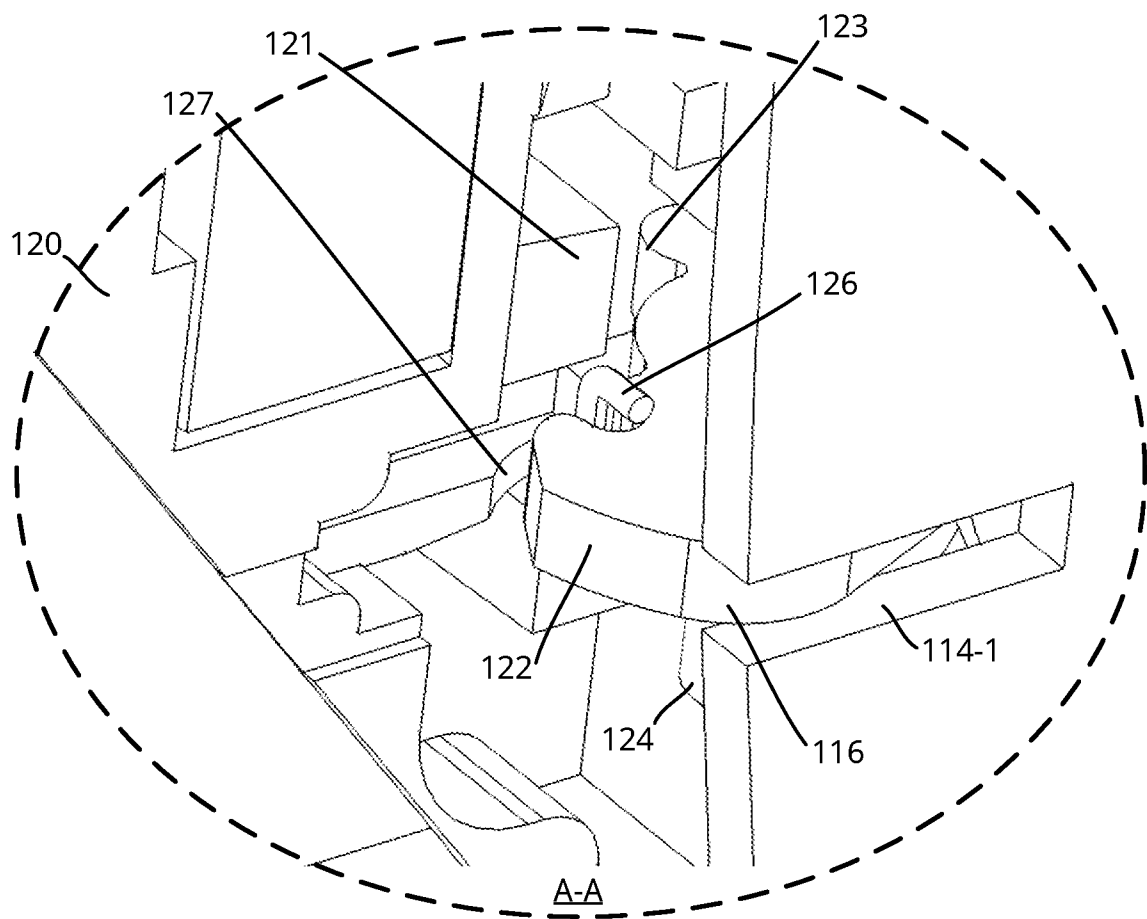


FIG. 4

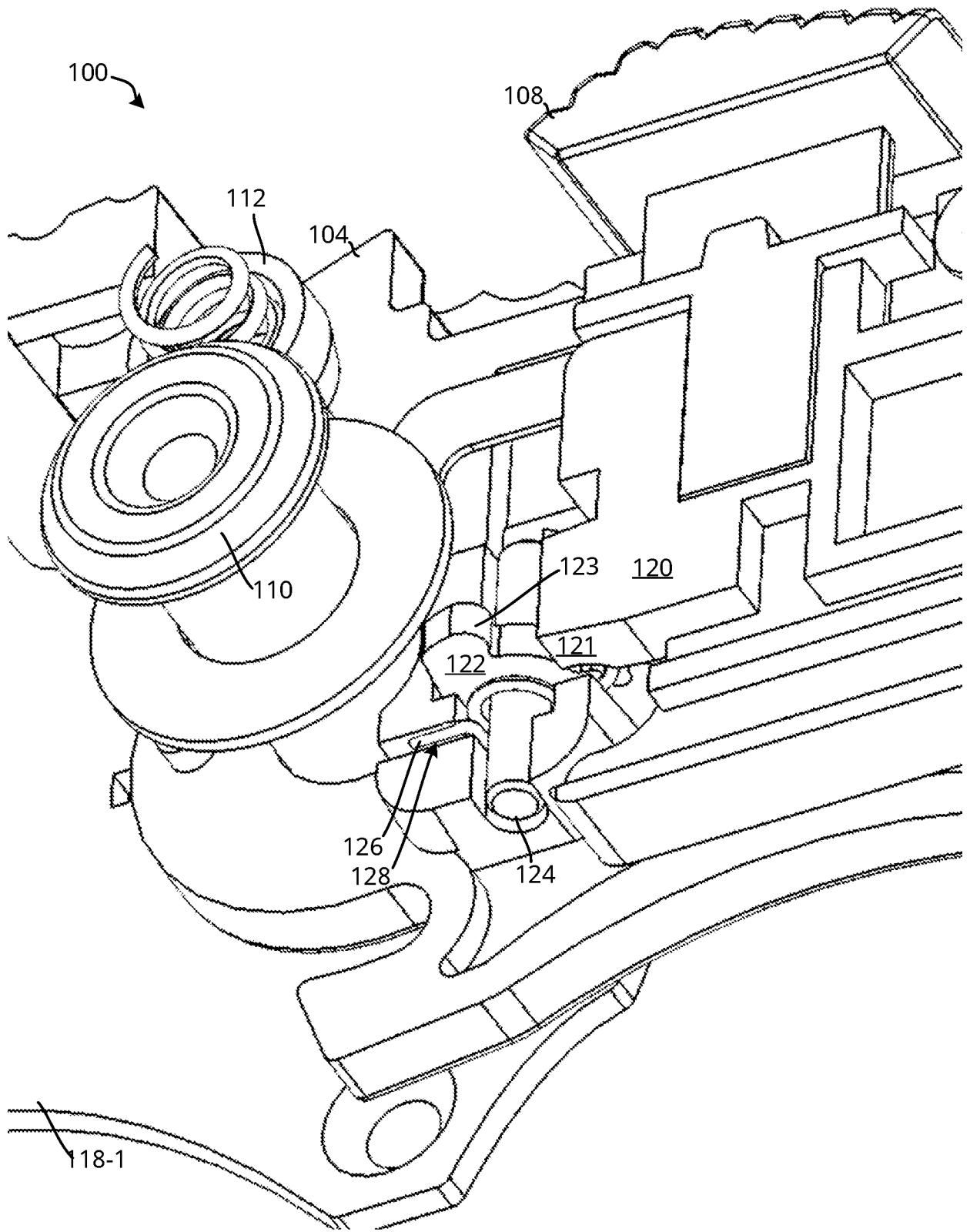
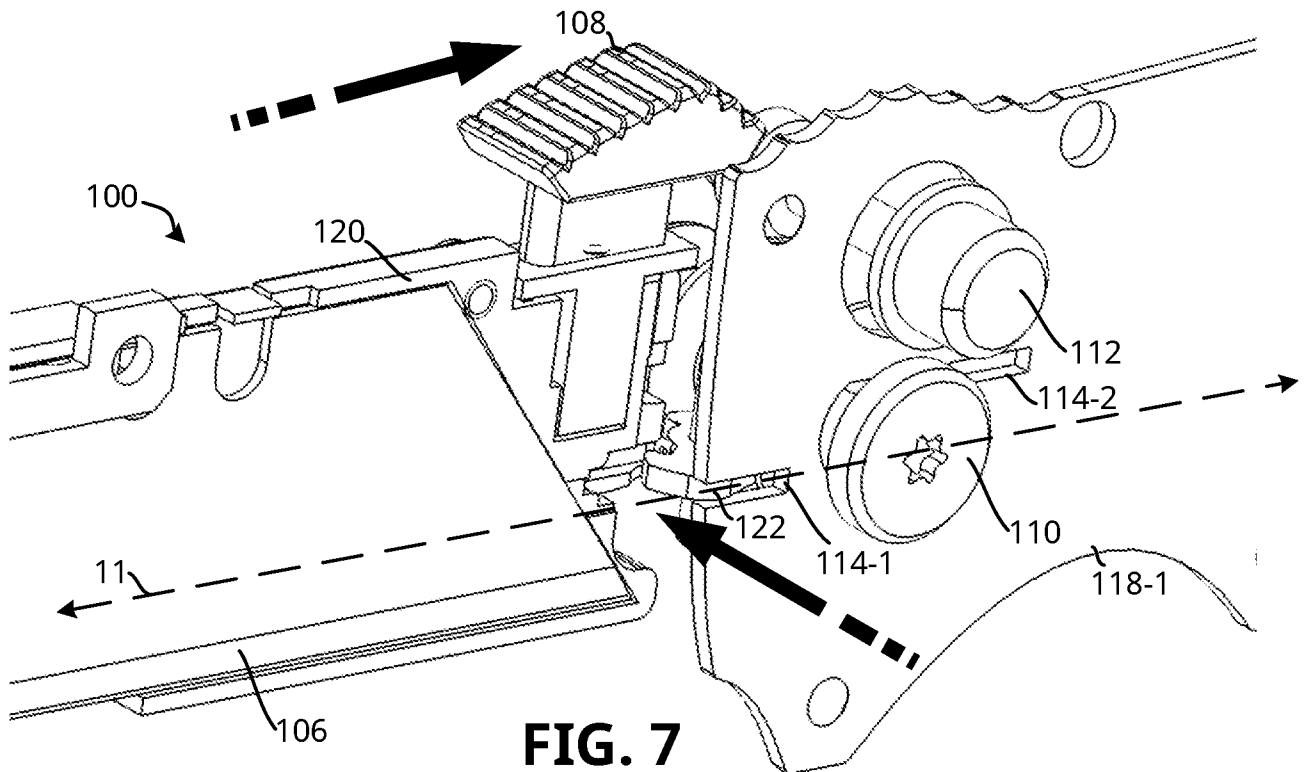
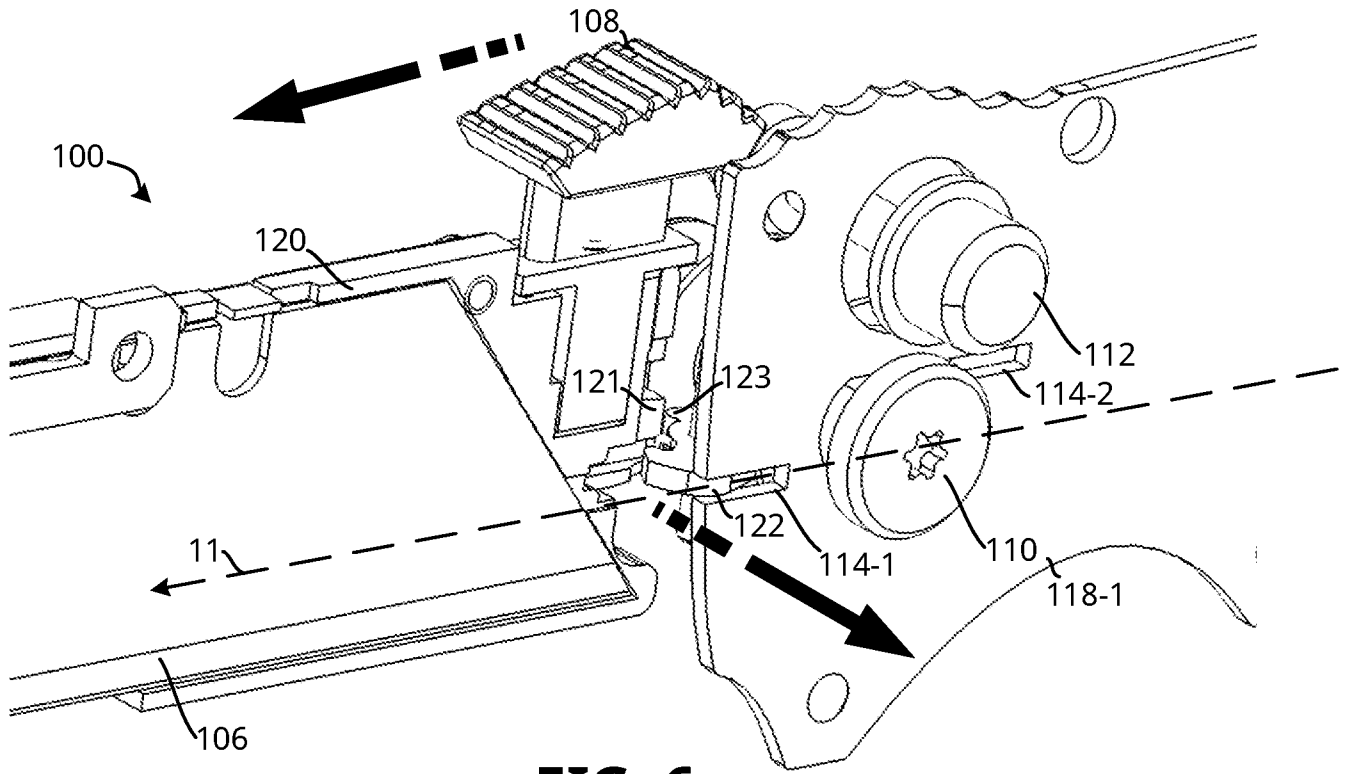


FIG. 5



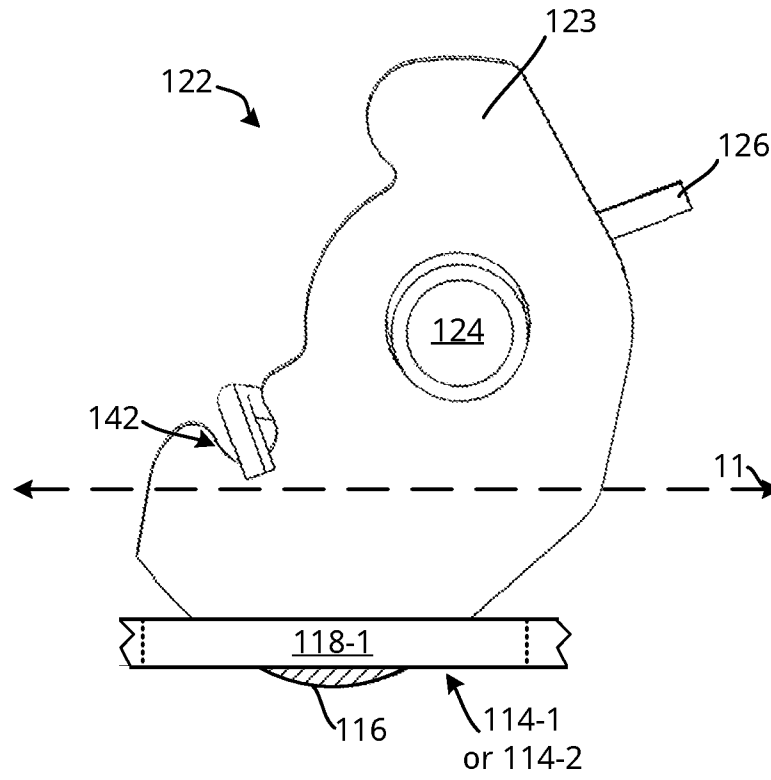


FIG. 8

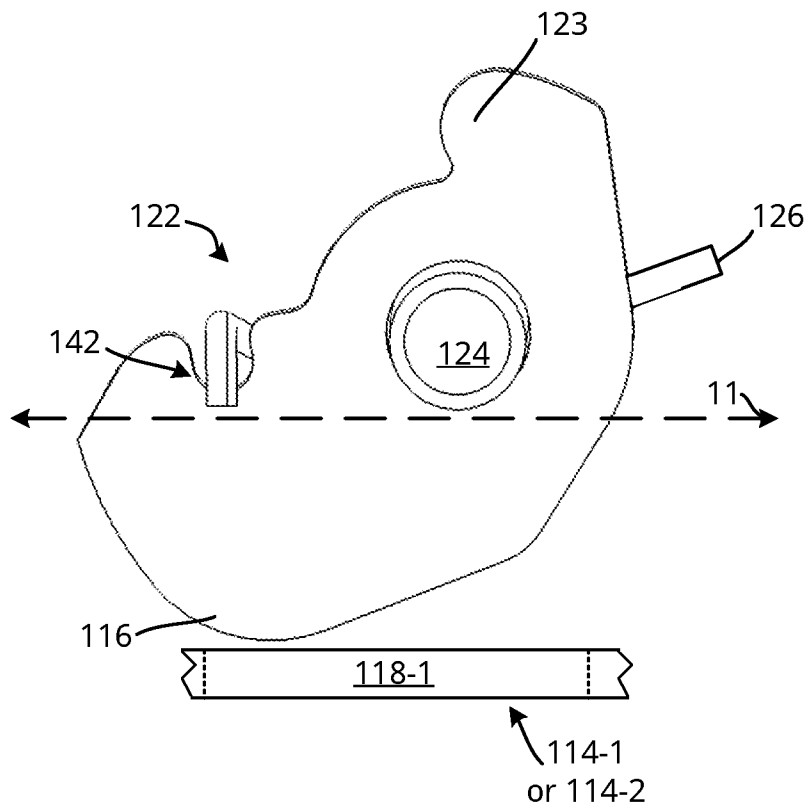


FIG. 9

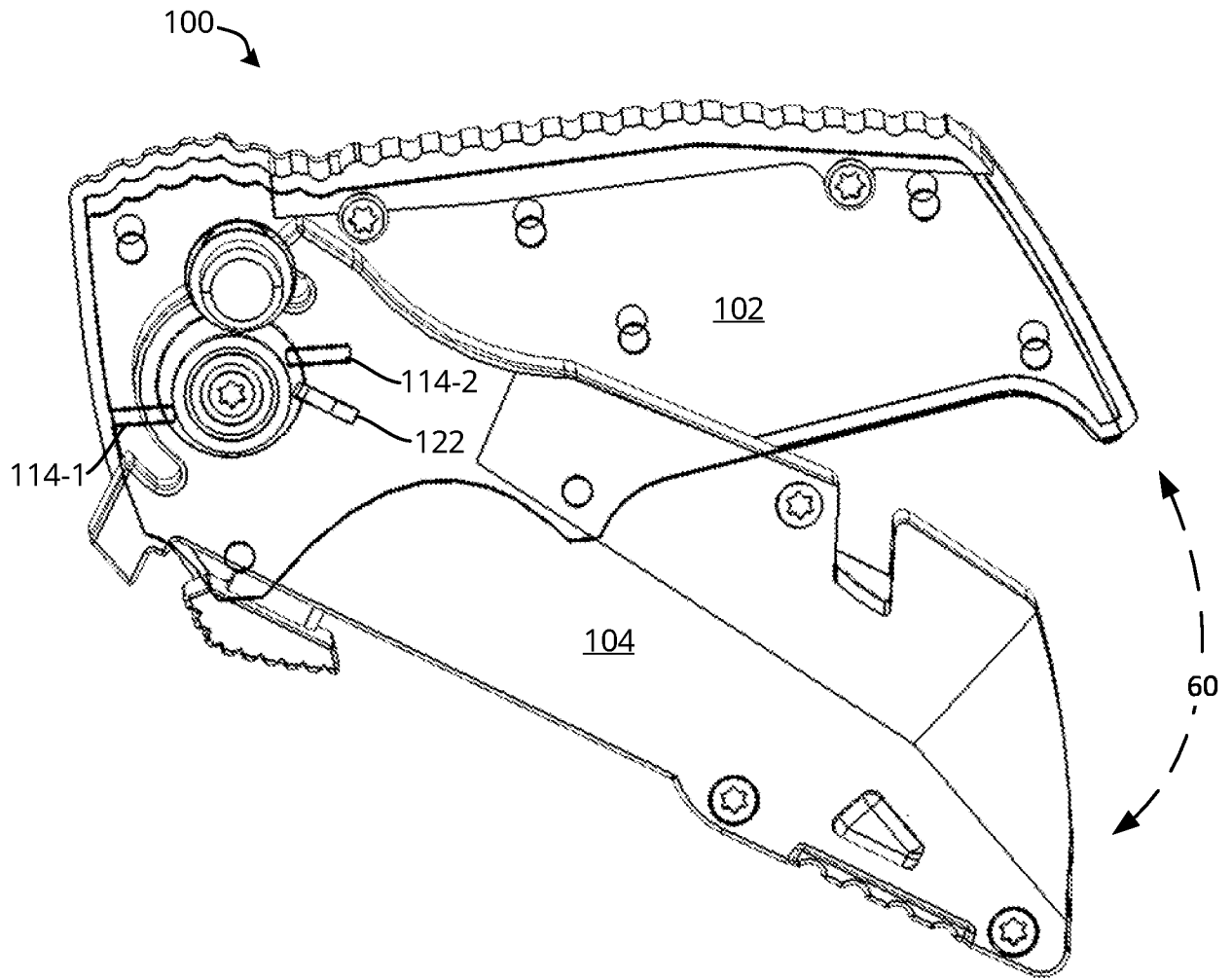


FIG. 10

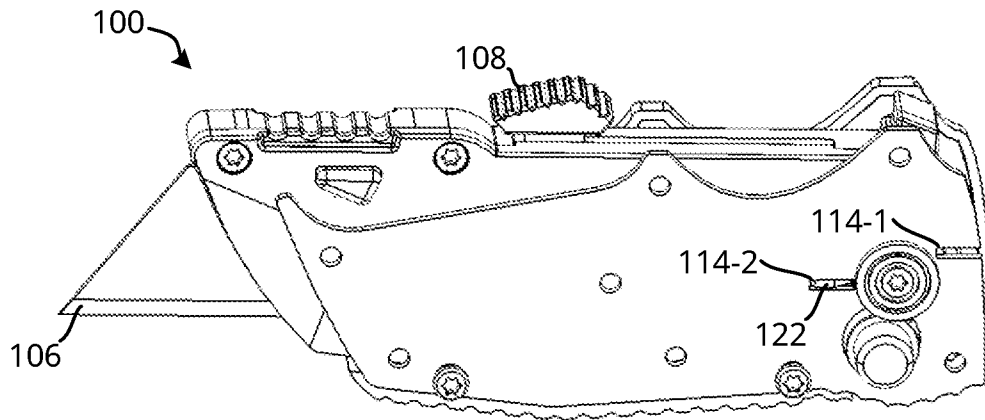


FIG. 11

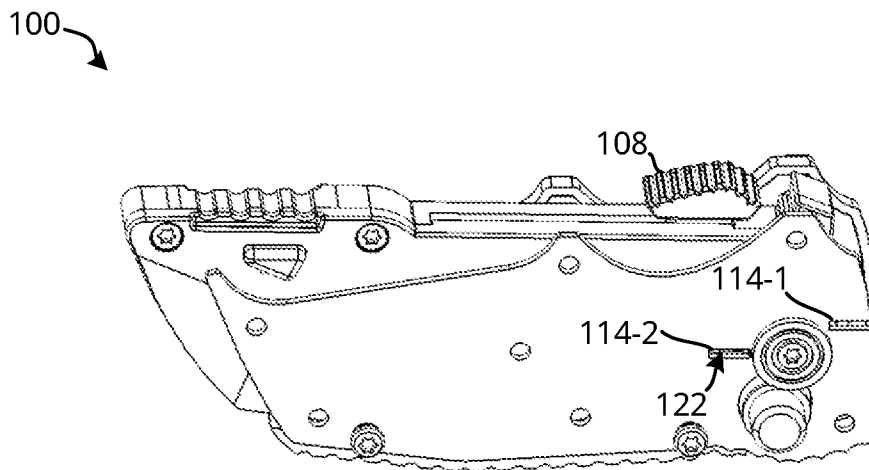


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/016768

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - B26B 5/00 (2016.01)
 CPC - B26B 5/00 (2016.02)
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 IPC(8) - B26B 1/02, 1/04, 1/08, 1/10, 5/00 (2016.01)
 CPC - B26B 1/02, 1/04, 1/042, 1/046, 1/048, 1/08, 5/00, 5/001 (2016.02)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 USPC - 30/156, 161 (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 Patbase, Google Patents, Google, Amazon
 Search terms used: utility knife, handle, blade, retract, fold, untold, lock, pin, spring, bias, pivot, rotate, detent, grooves, automatic, extend, expose, tab, notch

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010/0223793 A1 (HANSEN et al) 09 September 2010 (09.09.2010) entire document	1-20
A	US 2014/0259686 A1 (PACIFIC HANDY CUTTER INC) 18 September 2014 (18.09.2014) entire document	1-20
A	US 7,774,942 B2 (SCHMIDT) 17 August 2010 (17.08.2010) entire document	1-20
A	US 2010/0299935 A1 (PING) 02 December 2010 (02.12.2010) entire document	1-20

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 29 March 2016	Date of mailing of the international search report 14 APR 2016
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Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450 Facsimile No. 571-273-8300	Authorized officer Blaino R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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